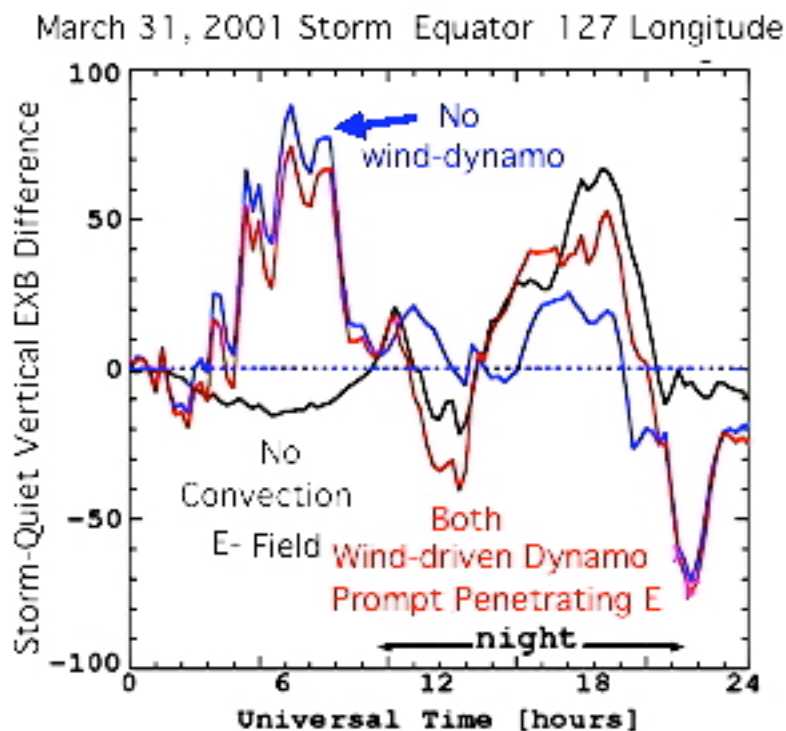


## Non-Linear Driving of Equatorial E-Field

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The CTIPe model, a coupled thermosphere-ionosphere model with self-consistent electrodynamics, demonstrated the importance of nonlinear mutual coupling effects on the storm-time ionosphere and electrodynamics. In this interactive model, the storm-time equatorial electric fields produced by direct penetration from high latitudes and by disturbance-dynamo effects do not superpose linearly at night, because the electric field modifies the conductivity distribution, which in turn modifies the penetration of electric fields from high latitudes and the generation of electric fields by the ionospheric wind dynamo



*The red solid line is a simulation including both effects of the disturbance-dynamo and penetration electric fields. Notice that it does not represent the sum of the separate effects, especially at night, as would occur if disturbance-dynamo and penetration electric fields did not interact. In reality they do interact, through modifications of the conductivity distribution.*

Reference: Maruyama, N., et al. (2005), Interaction between direct penetration and disturbance dynamo electric fields in the storm-time equatorial ionosphere, *Geophys. Res. Lett.*, 32, L17105, doi:10.1029/2005GL023763